

C. TYPHOON BETTY (220600Z-281200Z MAY 1961)

THE ORIGIN OF TYPHOON BETTY, UNLIKE MANY OTHER TROPICAL CYCLONES, CANNOT BE TRACED EASTWARD IN TERMS OF STATION PASSAGE TO ITS INCEPTION AS A CLOSED VORTEX. AVAILABLE DATA INDICATES THAT BETTY BECAME A CLOSED VORTEX BEFORE 201200Z S OF KOROR. THE 24 HOUR PRESSURE TENDENCY FALLS FROM MAJURO TO KOROR THAT FREQUENTLY PRECEDE THE DEVELOPMENT OF STRONG TROPICAL CYCLONES COMMENCED AT ABOUT 180600Z. THESE FALLS CEASED AT MAJURO AFTER 190600Z, AFTER 210900Z AT GUAM AND AFTER 211200Z AT KOROR. THE 201200Z SURFACE STREAMLINE CHART INDICATED A VORTEX BETWEEN KOROR AND THE EQUATOR WHICH MOVED SLOWLY NW AND PASSED KOROR AFTER 201200Z. PRIOR TO 201200Z ONLY AN E-W ELONGATED PRESSURE TROUGH EXISTED N OF THE EQUATOR FROM W OF KOROR TO KUSAI.

RECONNAISSANCE INTO THE CIRCULATION PROVIDED DATA TO ISSUE A TROPICAL STORM WARNING AT 220600Z, INDICATING 60 KT SURFACE WINDS NEAR THE CENTER. THE FIRST TYPHOON WARNING WAS ISSUED AT 221200Z.

AFTER THE FIRST WARNING BETTY MOVED NW TOWARD TAIWAN AT AN AVERAGE SPEED OF 10 KTS WITH THE RATE OF INTENSIFICATION OF SURFACE WINDS AVERAGING 5 KTS PER 6 HOURS. PEAK INTENSITY OF 130 KTS WAS REACHED AT 251200Z. THE TYPHOON PASSED LESS THAN 10 MI WSW OF BATAN ISLAND, ABOUT 120 MI N OF LUZON, JUST AFTER 252100Z. AT THIS TIME THE SURFACE WIND SPEEDS OF THE CIRCULATION WERE 125 KTS. THE HIGHEST REPORTED WINDS BY OBSERVATION AT BATAN WERE 100 KTS AT 251900Z. THE ANEMOMETER WAS CARRIED AWAY SHORTLY THEREAFTER. THE MINIMUM PRESSURE BY OBSERVATION WAS 957.5 MB AT 252100Z, JUST BEFORE THE CENTER OF THE EYE PASSED BATAN. AIRCRAFT RECONNAISSANCE AT 252320Z INDICATED THE MINIMUM PRESSURE TO BE 950 MB IN THE CENTER OF BETTY, WHICH WAS LESS THAN 20 MI FROM BATAN AT THAT TIME. THE TYPHOON "LANDED" ABOUT MIDWAY OF THE E COAST OF TAIWAN AT 261600Z WITH WIND SPEEDS OF 90 KTS. IT MOVED ACROSS THE ISLAND IN A NNW DIRECTION AT AN AVERAGE SPEED OF 18 KTS. THE LAND MASS EFFECTIVELY DESTROYED THE EYE OF THE TYPHOON AS SUCH, AND REDUCED THE MAXIMUM SURFACE WINDS AROUND BETTY TO 60 KTS. BETTY MOVED IN AN EASTERLY DIRECTION FOR THE FIRST TIME JUST AFTER 270000Z. THE STORM SKIRTED THE ASIATIC MAINLAND UNTIL IT REACHED 32N THEN VEERED SHARPLY NE AND MOVED INTO KOREA JUST N OF CHEJU-DO AT 280800Z. THE LAST WARNING WAS ISSUED AT 281200Z AS IT WAS RAPIDLY BECOMING EXTRATROPICAL. SHORTLY THEREAFTER IT BECAME IMBEDDED AT THE SURFACE IN A RAPIDLY INTENSIFYING EXTRATROPICAL CYCLONE AND LOST ITS IDENTITY.

THE PATH FORMED BY THE MOVEMENT OF BETTY IS FAIRLY TYPICAL OF THE TRACK CREATED AS A RESULT OF THE RIDGE LINE MOVING N DURING THE LIFE CYCLE OF A TYPHOON. THE 500 MB RIDGE MOVED FROM 20N AT 221200Z TO 24N AT 241200Z. A TRANSIENT ANTICYCLONE FORMED JUST WNW OF SHANGHAI ON 25 MAY, CREATING THE EFFECT OF FURTHER NORTHWARD MOVEMENT OF THE RIDGE LINE. THESE FACTORS TENDED TO CAUSE THE CONTINUED NORTHERLY MOVEMENT OF BETTY RATHER THAN RECURVATURE AT 18 TO 20 DEGREES N AS MIGHT HAVE BEEN EXPECTED OTHERWISE. AFTER THE TRANSIENT ANTICYCLONE MOVED EASTWARD OVER JAPAN, BETTY CURVED SHARPLY BEHIND IT AND MOVED TO THE NE.

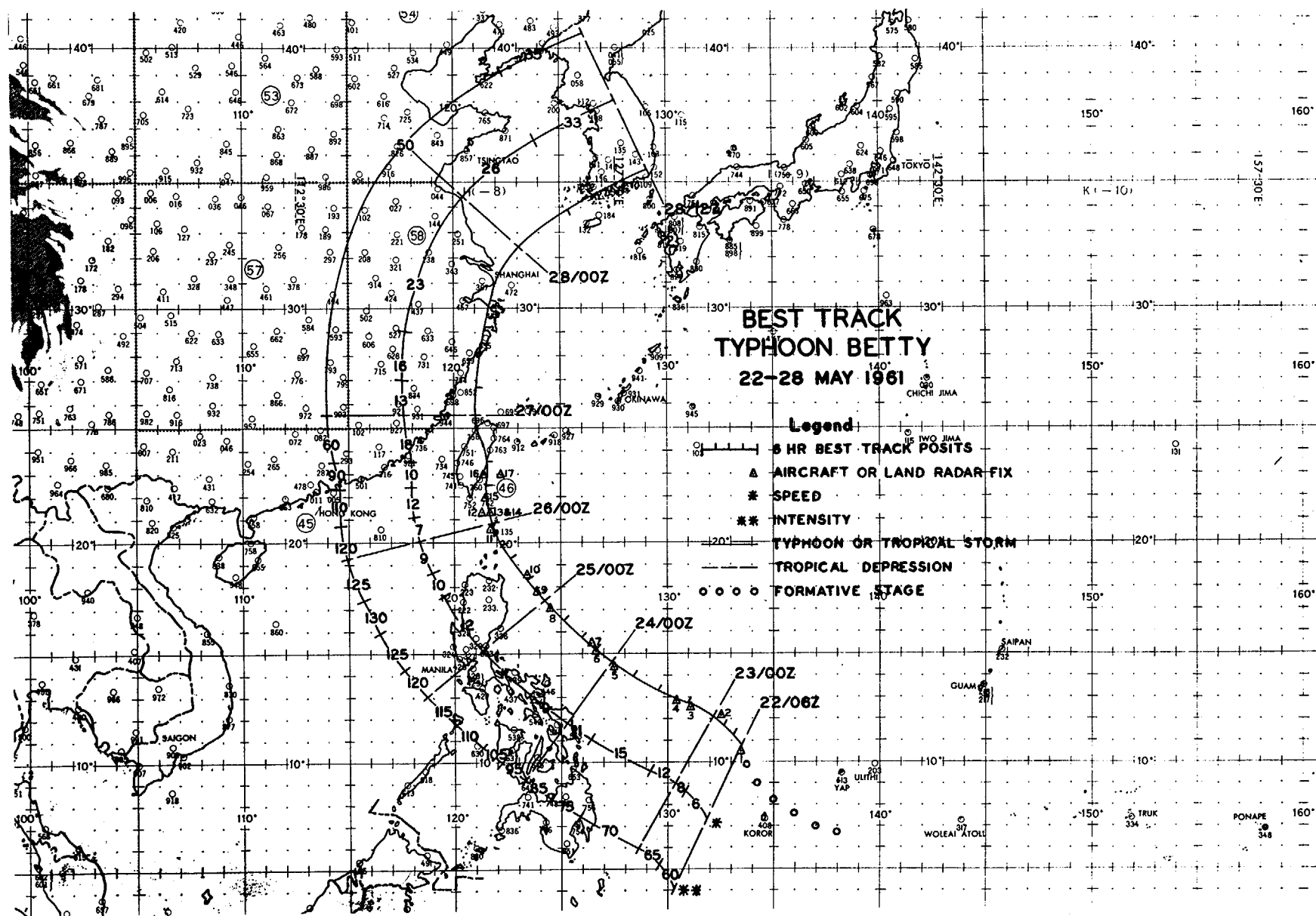
TYPHOON BETTY EXTENDED THROUGH THE 200 MB LEVEL AT 261200Z WHILE NEAR TAIWAN.

EACH YEAR ONE OR TWO UNUSUAL REPORTS OF CONCENTRIC EYES ARE MADE BY THE RECONNAISSANCE OBSERVERS. ONE REPORT WAS MADE ON TYPHOON BETTY AT 230500Z, THE TIME OF THE THIRD RECONNAISSANCE FIX AND IS QUOTED HERE: "VULTURE 0311 BETTY SIX EYE DATA REPORT PSN ONE TWO PT SIX NORTH AT ONE THREE ONE PT ONE EAST AT ZERO FIVE ZERO ZERO ZULU BASIS FOR FIX WIND CENTER FIX BY PENETRATION PSN BY LORAN ACCY 8 MI MAX OBSVD WINDS SFC 75K EAST QUAD MAX FLT LVL WND 55K EAST QUAD 700MB HT 9880FT XMTD SLP 984 MBS FLT LVL 673MB TEMP 11.5 DEGC DEW PT 2 DEGC TURB LIGHT ALL QUAD EYE WITHIN AN EYE DIA CIRCULAR DIA OF OUTER EYE 60 MILES DIA OF INNER EYE 20 MILES SC CLDS IN INNER EYE MOD RAIN ALL QUAD."

THERE ARE SOME INDICATIONS THAT THE WALL CLOUD SURROUNDING THE EYE OF A WELL DEVELOPED TYPHOON IS DETACHED FROM THE SPIRAL BANDS ASSOCIATED WITH THE TYPHOON, IF RADAR PICTURES MAY BE CONSIDERED EVIDENCE. THE POSSIBILITY THEN EXISTS THAT A SPIRAL BAND MAY COMPLETELY SURROUND THE WALL CLOUD FOR SHORT PERIODS OF TIME, THUS FORMING WHAT APPEARS TO BE THE OUTER CIRCULAR CLOUD PATTERN ASSOCIATED WITH THE PHENOMENA KNOWN AS A CONCENTRIC EYE.

TYPHOON BETTY TRAVELED 2025 MI IN THE 6 DAYS 6 HOURS THAT WARNINGS WERE ISSUED, AT AN AVERAGE SPEED OF 13.5 KTS. THE MINIMUM SPEED OF MOVEMENT, 6 KTS OCCURRED BETWEEN 220600Z AND 221800Z. THE MAXIMUM SPEED OF MOVEMENT, 33 KTS, OCCURRED BETWEEN 280600Z AND 281200Z. THE MAXIMUM SURFACE WIND SPEED OF 130 KTS OCCURRED BETWEEN 251200Z AND 251800Z.

THE AREAS AFFECTED BY BETTY WERE BATAN ISLAND, TAIWAN, THE ASIATIC MAINLAND JUST S OF SHANGHAI, AND KOREA. THE ONLY REPORTS AVAILABLE INDICATE EXTENSIVE CROP DAMAGE ON TAIWAN DUE TO FLOODING.



LAND RADAR AND AIRCRAFT FIXES - TYPHOON BETTY

FIX NO.	TIME	LAT.	LONG.	UNIT METHOD & ACCY	MAX SFC WND	MAX 700MB WND	MIN 700MB HGT	MIN SLP MBS	700MB T/T ₀ (°C)	EYE CHARACTERISTICS
1	220451Z	10.6N	133.4E	56-P-05	70	45	9990	990	18/07	CIRC 20MI DIA
2	222106Z	12.1N	132.6E	56-P-15	50	52	9820	982	16/01	CIRC DIA 50MI FILLED WITH SC
3	230500Z	12.6N	131.1E	56-P-08	75	55	9880	984	13/04	DOUBLE EYE DIA INNER EYE 20MI OUTER EYE 60MI
4	230800Z	12.9N	130.4E	56-P-10	70	55	9890	990	08/--	CIRC DIA 20MI
5	232240Z	14.6N	127.6E	56-P-02	60	70	9390	970	16/08	CIRC DIA 50MI OPEN SW-HVY WALL CLDS SE
6	240345Z	15.1N	126.8E	56-P-05	100	70	9240	971	15/06	CIRC DIA 60MI
7	240810Z	15.4N	126.5E	56-P-07	100	90	9190	968	17/13	CIRC DIA 25MI
8	242212Z	17.0N	124.6E	56-P-02	60	95	8780	954	17/07	CIRC DIA 40MI WELL DEFINED WALL CLDS ALL QUADS
9	250315Z	17.8N	124.0E	56-P-01	100	95	8610	946	17/06	CIRC DIA 30MI WALL CLDS ALL QUADS WELL DEFINED
10	250907Z	18.4N	123.6E	56-P-02	---	120	8630	947	21/10	CIRC DIA 20MI
11	252320Z	20.5N	121.8E	56-P-02	---	112	8730	950	20/09	CIRC DIA 45MI
12	260310Z	21.2N	121.3E	C-130-R-U	---	---	---	---	---	DIA 20MI
13	260443Z	21.2N	121.5E	56-P-01	---	105	8760	956	18/16	CIRC DIA 40MI
14	260545Z	21.2N	121.5E	VW1-R-10	---	---	---	---	---	-----
15	260845Z	21.9N	121.5E	56-P-01	---	90	8830	956	16/12	CIRC DIA 40MI
16	261400Z	23.0N	121.3E	LND/RDR	---	---	---	---	---	-----
17	261415Z	23.0N	122.1E	LND/RDR	---	---	---	---	---	-----

TYPHOON BETTY 22-28 MAY 1961
POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HR. ERROR	48 HR. ERROR
	LAT.	LONG.	DEG. DISTANCE	DEG. DISTANCE
220600Z	10.7N	133.5E	-----	-----
221200Z	11.2N	133.2E	-----	-----
221800Z	11.8N	132.8E	-----	-----
230000Z	12.2N	132.2E	-----	-----
230600Z	12.7N	131.0E	031-44	-----
231200Z	13.2N	129.6E	063-60	-----
231800Z	13.9N	128.3E	096-82	-----
240000Z	14.7N	127.5E	113-140	-----
240600Z	15.2N	126.8E	093-160	156-63
241200Z	15.7N	126.0E	221-90	193-70
241800Z	16.4N	125.1E	208-75	191-98
250000Z	17.2N	124.3E	026-136	133-130
250600Z	18.1N	123.6E	033-96	090-170
251200Z	19.1N	122.9E	121-75	127-82
251800Z	19.9N	122.2E	124-101	123-114
260000Z	20.7N	121.8E	123-62	063-334
260600Z	21.3N	121.5E	089-62	060-277
261200Z	22.5N	121.5E	114-80	121-154
261800Z	23.5N	121.4E	105-106	120-179
270000Z	25.3N	120.9E	090-97	110-190
270600Z	26.6N	121.0E	112-122	097-256
271200Z	28.2N	121.3E	106-208	096-325
271800Z	30.4N	121.8E	113-326	105-400
280000Z	32.5N	122.9E	225-270	112-441
280600Z	33.8N	125.5E	228-358	123-415
281200Z	35.4N	129.0E	236-382	131-421
AVERAGE 24 HOUR ERROR 142 MI				
AVERAGE 48 HOUR ERROR 229 MI				

